MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2016/2017

TDM7011 – Advanced Data Management

(All sections / Groups)

7th JUNE 2017
8.00 p.m - 10.00 p.m
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of 6 pages, including the cover page, with four questions only.

2. Attempt **ALL** questions in the paper. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please print all your answers in the answer booklet provided.

QUESTION 1

(a) What is the difference between a database and a table in the relational database terminology? [2 marks]

(b) You have been hired to design the data warehouse for the *Star Warehouse Co* company. There are four dimension tables as below :-

Customer (Cust_ID, Cust_Name, Cust_Contact)

Location (Loc_ID, Loc_Name, Loc_Store)

Product (Prod_ID, Prod_Description, Prod_Price)

Period (Period_ID, Year, Month)

The identified fact table is Sales which store the revenue for the company. Design a star schema to model the data warehouse for *Star Warehouse Co* company. [5 marks]

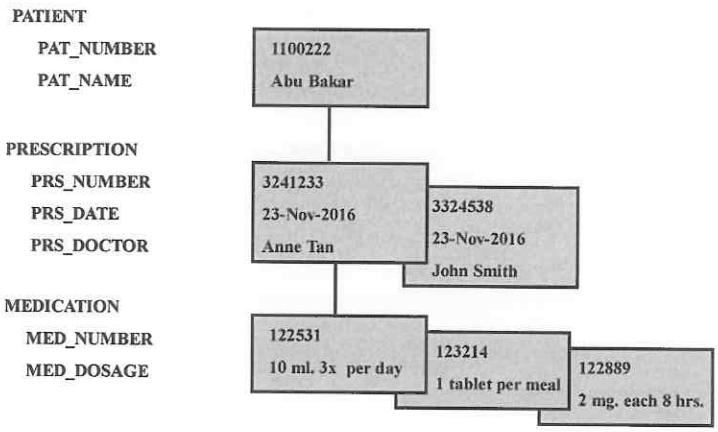
(c) Assume there are 100 records in each of the four dimension tables. Calculate the size for the fact table in terms of number of rows. [1 mark]

(d) Illustrate how *Destructive merge* operates in the loading phase of the ETL (Extraction, Transformation and Loading) process. [2 marks]

Continued...

QUESTION 2

(a) The hierarchical diagram below depicts a single record occurrence of a patient named Abu Bakar during his stay at a hospital. Typically, a patient receives several medications per day, through several prescriptions by the doctor during his stay.



(i) Name the THREE segment types. [1 mark]

(ii) Identify the components that are equivalent to the file system's fields. [2 marks]

(b) Based on the following business rules, draw a complete conceptual Entity Relationship diagram for the relational database for Vehicle Requisition System in Multimedia University. Include the all the identified entities, attributes, relationships, cardinalities and connnectivities. [4 marks]

- In MMU, there are many faculties.
- Each faculty contains at most 100 staffs.
- Each faculty may make reservation of vehicles for its faculty staffs.
- In a reservation, it consist at least one or more vehicles.
- The vehicles are categorized into several types such as sedan, bus, pick-up truck, bus, MPV and so on. It is possible that the vehicles are tagged into several categories.

Continued...

(c) Write the SQL commands to create the table MEMBER based on the following condition:

- Set member identification number (Mem_ID) to become an auto increase number where the starting value is 10000 and increment by 1
- Member name (Mem_Name) variable character with length 50
- Contact number (Mem_Contact) character with length 12
- Type (Mem_Type) must be a value between 1 to 5
- Member deposit (Mem_deposit) defaulted to 100

[3 marks]

QUESTION 3

(a) The following is a MEMBER table. Perform a vertical fragmentation on the MEMBER table. Show the results of vertical fragmentation. [2 marks]

Mem_ID	Mem_Name	Mem_Contact	Mem_Type	Mem_Deposit
M100	Abu	013 9988776	1	150
M200	Michael	012 9977665	3	50
M300	Arumugam	011 3344557	3	30
M400	Sam	010 2233445	2	100

(b) Briefly explain the Graph-based data model for NoSQL databases. Give example to illustrate your explanation. [2 marks]

Continued...

(c) Figure below shows the sample of XML document. Based on the figure, answer Questions (i) to (iv).

```
<productlist>
    <product id = "B001-05">
        <name> Computer </name>
        <uom> PCS </uom>
        <quantity> 10 </quantity>
        <price>3999.99</price>
    </product >
    <product id= "B002-02">
        <name> Pencil box </name>
        <price> 10.50</price>
    </product >
</productlist>
```

(i) Name the two data models for XML. [1 mark]

(ii) What is the difference between the two models you named in Question (i)? [1 mark]

(iii) Representing the XML document into any respective model identified in Question (i). [3 marks]

(iv) Express the query to retrieve all products where the name is "Pencil box" as an XPath query. [1 mark]

Continued...

QUESTION 4

(a) Not only SQL (NoSQL) is designed for distributed data stores where very large scale of data storing is needed. Name and explain the two types of possible scaling with NoSQL. [2 marks]

(b) MongoDB is a leading document-based NoSQL database, which works on the concept of **collection** and **document**. Define what collection and documents are. [2 marks]

(c) Suppose you have a collection of **Student** as follows. Answer Questions (i) to (iv) based on the collection.

```
{
 "_id" :
ObjectId("50c598f582094fb5f92efb96"),
 "first_name" : "Tim",
 "last_name" : "Tong",
 "student_id" : "1001028444",
 "course" : [
      "TPT3043",
      "TIS1234",
      "TIS1123",
 ]
}
```

(i) What does the "_id" indicate? How is ObjectId constructed? [2 marks]

(ii) Write the command to insert the collection into **Student**. [1 marks]

(iii) Using the update() function, modify the first_name for student with id '1001028488' to 'Timmy'. [1 mark]

(iv) Count the number of courses taken by each student. [2 marks]

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